

# Blended Is Better: Choosing Educational Delivery Methods

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**Abstract:** As educators we are constantly revising our teaching delivery methods to accommodate the ever diversifying demographic catchments of students. In the last 10 to 15 years, teaching has evolved from teacher centred chalk and talk to student centred online learning. Technology has driven further changes in pedagogical strategies. Delivery methods have evolved to reflect these pedagogical strategies often resulting in a blended solution. This paper examines the benefits and disadvantages of various delivery methods and suggests recipes for blending the different approaches. The ingredients for the blending include lectures, group discussion in various environments, apprenticeship, film, Computer Assisted Learning (CAL), e-learning and experiential learning. Our discussion examines the reasons for the failure of a single strategy delivery in today's climate and discusses the benefits of blending delivery methods. We construct a simple framework for the selection of delivery methods applicable to computing courses, and provide examples in the use of this framework.

**Keywords:** Blended learning, e-learning, educational theory, small group discussion, apprenticeship, e-learning, multimedia, computer based instruction

## 1. Introduction

The eclectic mix of backgrounds typical in today's students at tertiary institutes is quite different from the predominantly full-time male, school-leaver of past decades (Taynton, 2000). The new generation of technologically aware students often desire entertainment integrated with instruction. The changing nature of our student population, together with the diversity of subject matter and increased student expectations, forces education professionals to constantly investigate and revise teaching delivery methods. Advances in communication methods and technology since the 1990s has driven teaching to evolve from didactic "chalk and talk" to student centred learning, computer based training and e-learning. These advances have also driven changes in pedagogical strategies, some more successful than others. In this paper, we discuss several delivery methods in regard to their focus on learning, highlighting their benefits, disadvantages and constraints.

From a review of literature on delivery methods and educational theory, we have produced a framework for the reader to construct a blended delivery template. The choice of implementation of delivery remains the responsibility of the instructor.

## 2. Methodology

The methodology used in this paper is the development of a framework from a review of literature. The literature has been taken from educational theory and instructional design theory.

## 3. Educational Delivery Methods

There are numerous delivery methods, many of them extensions of others. For the purposes of developing a framework, we have chosen to group them in the general categories of

1. Small group Discussion - from classroom to video conferencing
2. Apprenticeship
3. Lecture (large Group)

4. Film
5. Computer Assisted Learning (CAL)
6. Computer Mediated Conferencing (CMC)
7. E-learning
8. Experience - in situ and contrived
9. Blended Learning

## **4. Discussion of Educational Delivery Methods**

### **4.1 Small Group Discussion -from classroom to video conferencing**

In ancient times this type of delivery was a favourite of philosophers such as Plato and Socrates (469-399 BC) aimed at developing critical thinking on a variety of topics by discussion and questioning discourse. Today this is still favoured as a means of brainstorming, inquiring, sharing knowledge and analysis and resolution of issues. Vygotsky's social development theory (Wertsch, 1985) suggests that cognitive development does not occur in isolation and proponents of this theory have based their group based discussions on this premise.

Studies by Hausfather, (1996 in Riddle & Dabbagh, 1999) offer empirical evidence that learning based on Vygotsky's social development theory facilitate cognitive development over other traditional instructional strategies. (Riddle & Dabbagh, 1999) However, it has been ascertained that it is essential for the participants to be on different developmental levels and for the higher level participants to be aware of the lower participants' levels. If this does not occur, or if one participant dominates, the interaction is less successful (Riddle and Dabbagh, 1999).

### **4.2 Apprenticeship**

A time proven favourite method of delivery is an apprenticeship. In this method, a novice seeks to learn from a master often on a one-to-one relationship. The master (sage) is expected to instruct the novice in techniques, tools and best practice. The novice is expected to gradually take over some of the master's work as competency increases, eg. Silversmiths, plumbers, artists and designers.

Kearsley (1994) suggests

1. "The highest level of observational learning is achieved by first organizing and rehearsing the modeled behavior symbolically and then enacting it overtly.
2. Individuals are more likely to adopt a modeled behavior if it results in outcomes they value.
3. Individuals are more likely to adopt a modeled behavior if the model is similar to the observer and has admired status and the behavior has functional value."

Jonassen (1998, p. 12) defines two types of modelling: behavioural modelling of the overt performance and cognitive modelling of the covert cognitive processes. Behavioural modelling "demonstrates how to perform the activities" while cognitive modelling "articulates the reasoning that learners should use while engaged in performing the activity". Apprenticeships aim to provide a cognitive and behavioural development. However, this delivery method is expensive in time and resources because of the necessity of the close proximity of instructor and the requirement for both parties to be in the same physical environment.

### **4.3 Lecture (large Group)**

When social expectations brought education to the masses, formal talks to large groups (lectures) became necessary as an economy of time. The lecturer is expected to be a sage on the stage with relatively little discussion or participation from the audience. During a lecture the audience is expected to experience the reality of the lecturer during what is generally considered by universities to be the optimal method for conveying concepts and information to large groups. Although this delivery is more economical in terms of time and effort on the part of the instructor, because the participants are housed in the same environment, this delivery lacks the social interaction considered advantageous for cognitive and behavioural development according to Jonassen (1998).

#### **4.4 Film**

Used by the Military as a means of propaganda and morale boosting during World War II, the use of film was recognised as an effective method of training combatants (Souder, 2001). As technology improved, this method migrated to education. Latterly the film medium has progressed from 35 mm cinematography to videos, DVDs and imovies. The use of training films has been shown to speed the training processes, (Souder, 2001), but the film has to be tailored or constructed to address the learning needs of the trainees. Film development can be expensive, inflexible, and, for some subject material, can date rapidly

#### **4.5 Computer Assisted Learning**

In this delivery method, the learning is achieved by interacting with software packages which have predetermined answers or responses. The preparation of the content is designed to allow learning that is asynchronous with the designer's/lecturer's instruction. This delivery method allows for matching an individual student's knowledge and skills to the level of instruction. (Valdez & McNabb, 1997 in Valdez, McNabb, Foertsch, Anderson, Hawkes & Raack, n.d.) This method is implemented by directed activities with practice and feedback, placing it in the discovery learning sphere. (Schunk, 2000)

According to Valdez et al. (n.d.), "Computer-assisted instruction appears more appropriate in settings where teachers' content knowledge and skills are quite low." This may be the case for some learning situations (e.g. teacher aid tutoring in an unfamiliar area) if there are no other complementary methods employed, but we disagree that this is the general case. We do agree, however, with Valdez et al. (n.d.) when they go on to say "Efforts to introduce more advanced interactive and open-ended technology applications will require significant professional development opportunities and a sufficient critical mass of technology resources before they can benefit students. As indicated by the research findings ..., technology is likely to be more successful when the software, the purpose for instruction, and the learning objectives match teachers' understanding of learners' needs to memorize and respond to predetermined answers. Equally important is an appropriate matching of the levels of student knowledge and prerequisite skills and the expectations of the software. There also has to be an appropriate matching of teachers' knowledge of both the content and appropriate uses of technology and the desired learning objectives."

#### **4.6 Computer Mediated Conferencing (CMC)**

This delivery method is also known as online threaded discussion groups. In this delivery, which allows for socially constructed learning and meaning, topics for discussion are posted on a communally accessible online area. Within these discussion areas, participants are expected to post regular contributions which add to the general community of knowledge or pose questions that extend the topic. As noted by McGrath (1997-1998), this collaborative method of electronic conferencing results in "greater inquisitiveness, expressiveness, risk taking, decreased inhibition, reduction of gender barriers and increased social connectedness". The asynchronous and online nature of the contributions allows greater participation of non-traditional students (New Zealand Government, 2003 p.4), which in turn encourages lateral thinking. The asynchronous nature also provides for the development and maturation of ideas over an extended time. The increased participation of students increases the effectiveness of learning (Ladyshevsky, 2004) and socialisation (Salmon, 2000). However, in common with the small group discussion method of delivery, an over exuberant contributor can stifle contributions from less aggressive or knowledgeable peers. Managing these discussions requires moderating skills and regular monitoring of the discussions (Salmon, 2000).

#### **4.7 E-learning**

E-learning can be defined "...as a generic term describing the integration of information and communications technology into ... learning and teaching both on and off campus." (Imperial College, 2003). This delivery method has been adopted to serve non-traditional students who, for various reasons, are unable to attend on campus structured tuition. E-learning can range from static pages of course notes displayed on the Internet to complex multimedia interactive productions and can include online discussion groups as described above. Education theorists are divided over pedagogical issues in e-learning delivery. Because of the diversity in instructional design or lack of it, sites vary in their ability to promote learning. According to Mioduser, Nachmias, Lahav and Oren, (2000 in Ladyshevsky, 2004) "most sites promoted individual rather than collaborative learning, instruction rather than inquiry, clicking rather than communicating and automatic

feedback rather than guidance and memorisation rather than knowledge construction”. Perhaps it is for these reasons that there is “a growing movement away from e-learning in favour of in-class training and teaching. [Furthermore] e-learning projections have actually fallen...In contrast, classroom training continues to grow... Learners still prefer a live instructor to learning via a system without a mentor, facilitator, or instructor.” (Saunders and Werner, 2004).

Providing complete e-learning facilities is not a short term commitment. McNaught, Kenny, Kennedy, and Lord (1999) found that “a campus ‘all in’ approach speeds the process ... but is costly, and the change management necessary to facilitate the implementation is expensive and complicated.”

#### 4.8 Experience - In situ and contrived

These two methods are basically the same, where the participant is able to enjoy a live or authentically contrived experience. Within Dale’s cone of experience, as quoted in Alabama Professional Development Modules, (Alabama Department of Education, 2003), live experience is considered the most beneficial to learning. “The opportunity for a learner to use a variety or several senses (sight, smell, hearing, touching, movement) is considered in the cone. Direct experience allows us to use all senses... Verbal symbols involve only hearing...Perceptual learning styles are sensory based. The more sensory channels possible in interacting with a resource, the better the chance that many students can learn from it.” (Alabama Department of Education, 2003). This delivery method, while one of the best, is an organisational challenge when dealing with large numbers of students. Matching the experience with the learning required is not always possible.

#### 4.9 Blended Learning

Blended learning is a mix of delivery methods that have been selected and fashioned to accommodate the various learning needs of a diverse audience in a variety of subjects. This method can include any combination of any of the above delivery methods. It allows flexibility in adapting learning instructional methods to meet the needs of students who respond to repetition of subject matter provided in different modes of delivery. This accommodates different learning styles and different speeds of cognitive learning. Subject material can be presented in a variety of formats, each reinforcing another, and can utilise subject experts for sections of the delivery. A well designed blended method can make use of physical and virtual classrooms using technology ranging from primitive to state-of-the-art. This variety in delivery methods, ranging from experiential to instructional, and structured to unstructured, can re-vitalise subjects that have lost their appeal. The variety in methods increases the interest, resulting in more effective learning. It is imperative that the delivery methods are matched to the subject matter and the audience. “When one looks at the fundamentals of learning, it is clear that no single approach or method can achieve maximum learning across a variety of learners. Only a blend of methods and approaches can produce the richness and achieve the desired learning outcomes.” (Saunders and Werner, 2004)

On the negative side, poor instructional design and implementation, including too much variety or the wrong medium, can detract from the learning experience. A poor design of blended learning may even result in a decrease in effective learning compared with a delivery single method.

### 5. Framework for Blended Learning

Table 1 shows the generic framework for designing course instruction to match learning outcomes.

A	B	C	D	E	F	G
CATEGORY OF LEARNING NEEDS	EXAMPLES	POSSIBLE METHODS	BENEFITS	CONSTRAINTS / DIFFICULTIES	LIKELY EFFECTIVENESS	POSSIBLE BLEND
This column is used to describe the skills or concepts that need to be learnt	Examples place the learning needs in context	A selection from the list given or other method	Allows author to clarify benefits of particular selected method. Used as a check.	Indicates possible challenges to implementation	Provides ranking for selected method. Used in conjunction with columns D and E	Suggestions of complementary methods

**Table 1:** Generic Framework for blended learning

## 6. Discussion of Framework

The framework in table 1 is intended to be used as a guide for the selection of delivery methods. As shown in tables 2 to 7 in the appendix, the use and combination of different delivery methods depends on the category of learning needs and available resources. For this reason, the benefits, constraints and difficulties are listed. For each category and delivery method, complementary methods are suggested. Combinations may work for one particular situation, but be unsuitable for others. In the examples of the use of this framework, (see appendix), we have provided a selection of blends that may assist in designing or improving course delivery.

## 7. Conclusion

In this paper we have examined a variety of common educational delivery methods. For each of these methods, we have examined the underpinning theory and suitability for addressing a variety of learning needs. The fact that educators are still searching for, and being encouraged to use, new methods of delivery indicates that there is not a best method applicable to all learners and subject matter. This has been supported by the literature surveyed. As stated by Saunders and Werner, (2004) “No single approach or method can achieve maximum learning across a variety of learners. Only a blend of methods and approaches can produce the richness and achieve the desired learning outcomes.” Our in-field experience supports the premise that blended is best.

We have developed our framework as a guide for enhancing educational delivery. The framework provides a useful tool for determining which of a variety of methods are suitable for particular categories of learning needs. The framework is intended to be a useful adjunct to support practitioners in the field of education.

## 8. Appendix : The Framework Applied to Learning Needs categories

### 8.1 The framework applied to the learning of situational concepts.

CATEGORY OF LEARNING NEEDS	EXAMPLES	POSSIBLE METHODS	BENEFITS	CONSTRAINTS / DIFFICULTIES	LIKELY EFFECTIVENESS	POSSIBLE BLEND
Situational concepts	Business situations Real Life situations	Lectures	Mass delivery	Non visual, lack of social interaction, matching the content with the concept	Low/ Moderate and dependent on lecturer	Small group discussions
		Film	Mass delivery, visual, warm medium	Matching the content with the concept, no social interaction	Moderate - enhanced by post film discussion	Small group discussions
		Contrived experience	Simulated life experience	Exposure, limited to simulated conditions	Moderately high to high	Small group discussions
		In situ experience	Real life experience	Exposure, limited to conditions at the time	High depending on authenticity and complexity of experience	Small group discussions

**Table 2:** The framework applied to the learning of situational concepts.

## 8.2 The framework applied to the learning of 3-D concepts.

CATEGORY OF LEARNING NEEDS	EXAMPLES	POSSIBLE METHODS	BENEFITS	CONSTRAINTS / DIFFICULTIES	LIKELY EFFECTIVENESS	POSSIBLE BLEND
3-D concepts	Architecture and Engineering	Lecture	Mass delivery	Non visual if no slides Matching the content with the concept	Poor	CAL, Film, experience
		Film	Mass delivery, visual, different visual perspectives, warm medium	Matching the content with the concept	Moderately high	CAL, experience
		Computer Assisted Learning	Visual, individually paced, repetition possible	Matching the content with the concept, expensive to develop	High	Experience
		In situ experience	Real life experience	Exposure, limited to availability of example	High depending on experience, authenticity	CAL

**Table 3:** The framework applied to the learning of 3-D concepts.

## 8.3 The framework applied to the learning of HCI concepts.

CATEGORY OF LEARNING NEEDS	EXAMPLES	POSSIBLE METHODS	BENEFITS	CONSTRAINTS / DIFFICULTIES	LIKELY EFFECTIVENESS	POSSIBLE BLEND
Human computer interface (HCI) concepts	Multimedia Website development Instructional design	Experience	Full visual and behavioural effects	Limited to available users responses	High	Small group discussion
		Group based discussion	Lateral thinking	Group solutions not always best	High	CAL, Apprentice
		Apprentice	Best practice and tips	May restrict creativeness	High	Small group discussion
		Computer Assisted Learning	Visual and audio examples	Lack of critical feedback	Moderate	Small group discussion

**Table 4:** The framework applied to the learning of HCI concepts.

#### 8.4 The framework applied to the learning of logical processing.

CATEGORY OF LEARNING NEEDS	EXAMPLES	POSSIBLE METHODS	BENEFITS	CONSTRAINTS / DIFFICULTIES	LIKELY EFFECTIVENESS	POSSIBLE BLEND
Logical processing	Problem Solving Mathematics Programming Analysis and design	Lectures	Mass delivery	Non visual unless slides, difficulty in demonstrating cause and effect, difficulty in visualising abstract concepts no social interaction	Poor to moderate, depending on content and lecturer	CAL, CMC, small group discussion
		Computer Assisted Learning	Visual, individually paced, repetition possible	Matching the content with the concept, expensive to develop	High	CMC, small group discussion
		Apprentice	Individual tuition, practice, with mentoring	Expensive use of mentor, not possible for large groups	High	CMC, small group discussion
		Group based discussion	Lateral thinking	Group solutions not always best	Moderate	CAL
		CMC	Allows development of ideas over an extended time, lateral thinking	Could overwhelm	Moderate (high for certain problems)	Apprentice

**Table 5:** The framework applied to the learning of logical processing.

#### 8.5 The framework applied to the learning of atomic level concepts.

CATEGORY OF LEARNING NEEDS	EXAMPLES	POSSIBLE METHODS	BENEFITS	CONSTRAINTS / DIFFICULTIES	LIKELY EFFECTIVENESS	POSSIBLE BLEND
Atomic level concepts	Visualisation of the reality of unseen processes	Computer Assisted Learning	Interactive visual exploration materialises abstract ideas	Expensive to develop, but growing bank of teaching resources.	High	Group discussions
		Film	Mass delivery, visual, warm medium	Matching the content with the concept	Moderate - enhanced by post film discussion	Small group discussions
		Lecture	Mass delivery	Not suited to concrete learners	Low to moderate	Enhanced by film or CAL

**Table 6:** The framework applied to the learning of atomic level concepts.

## 8.6 The framework applied to the learning of motor skills.

CATEGORY OF LEARNING NEEDS	EXAMPLES	POSSIBLE METHODS	BENEFITS	CONSTRAINTS / DIFFICULTIES	LIKELY EFFECTIVENESS	POSSIBLE BLEND
Motor skills	Driver training Machinery control	Computer Assisted Learning – simulator (equates to contrived experience)	Individually paced, repetition possible, physical safety	Relies on authenticity of simulator	High	CAL followed by in situ experience is the best mix
		Experience – in situ	Real feedback to actions	Could have safety repercussions	High	

**Table 7:** The framework applied to the learning of motor skills.

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